East Bay Municipal Utilities District

Gravel Enhancement Projects

Introduction

EBMUD takes its stewardship role in the lower Mokelumne River very seriously. The Salmon Spawning Habitat Improvement Project is a joint effort of EBMUD, the California Department of Fish and Game and the US Fish and Wildlife Service to protect and enhance the ecological resources in the lower Mokelumne River.

This project, in combination with the other resource restoration measures conducted by EBMUD and others, will improve the environmental health of the lower Mokelumne River and the Bay-Delta ecosystem.

Heavy equipment placing salmon spawning gravel in the lower Mokelumne River in the vicinity of EBMUD's Mokelumne River Day Use Area

Background

Due to their value as a sport and commercial fishery, and as an indicator of ecological health of the river, Chinook salmon are the primary focus of fisheries management in the lower Mokelumne River. The Mokelumne River Fish Hatchery, owned by EBMUD and operated by the California Department of Fish and Game, is one of the most successful salmon production facilities in California. But encouraging in-river spawning is a vital part of Mokelumne River fisheries management.

Scientists have determined that spawning habitat quality and quantity are the second most important factor in the production of salmon in the lower Mokelumne River. Camanche Dam blocks the movement of gravel from upstream sources. Also, there are several historic gravel mining areas along the river. These mines have removed hundreds of thousands of tons of gravel from the river and floodplain.

Project Description

In 1990, EBMUD placed 500 cubic yards of suitable sized, washed river gravel in the lower Mokelumne River directly below Camanche Dam. The experimental project continued in 1992, with a load of 300 cubic yards of gravel being placed further down the river at Murphy Creek; in 1993, with 500 cubic yards being placed in the river at the Mokelumne River Day Use Area; and in 1994, with 100 cubic yards being again placed at the Day Use Area. The three sites were re-graveled in 1996 with 650 cubic yards and again in 1997 with a total of 1,500 cubic yards.

EBMUD evaluated the experiment in 1996 and data showed that the project had provided the following Mokelumne River fishery improvements: increased intergravel permeability; increased dissolved oxygen content; reduced intergravel water temperatures in most situations; and increased aquatic insect population within shorter periods. Lastly, within three months of gravel placement, adult Chinook salmon used the new gravel for spawning.

In September 1998, EBMUD implemented the three-year Salmon Spawning Habitat Improvement Project (which was co-funded by the California Department of Fish and Game and the US Fish and Wildlife Service) based on the positive results of the experimental project. The project goal is to conserve the genetic diversity of the Mokelumne River Chinook salmon stocks. The washed gravel is trucked in from an open floodplain gravel quarry during the summer months so as to have a minimal impact on anadromous fish. In this three-year project, EBMUD placed 1,200 cubic yards of gravel in the lower Mokelumne in 1998; 3,000 cubic yards in 1999; and 1,200 cubic yards in 2000. EBMUD is continuing the project indefinitely, placing 1,200 cubic yards in 2001, and 2,400 cubic yards in 2002 and 2003.

Conclusion

The Salmon Spawning Habitat Improvement Project, provides increased available spawning habitat, improves gravel permeability and is expected to increase Mokelumne River in stream production of fall-run Chinook salmon. Increased gravel substrate increases production of aquatic invertebrates and hence the food base available for juvenile salmon. The project will continue to improve Chinook salmon stocks in the Mokelumne River which will conserve the genetic diversity of these stocks and species. Maintaining this genetic diversity provides the genetic basis by which fish populations can respond to fluctuating environmental conditions and survive.